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Principles for Speech-Language Pathologists in Diagnosis, Assessment, and Treatment of Autism Spectrum Disorders Across the Life Span

Ad Hoc Committee on Autism Spectrum Disorders

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Introduction

The position statement, *Roles and Responsibilities of Speech-Language Pathologists in Diagnosis, Assessment, and Treatment of Autism Spectrum Disorders Across the Life Span*, by the American Speech-Language-Hearing Association (ASHA), emphasizes the critical role of the speech-language pathologist in screening, diagnosing, and enhancing social communication development and quality of life for children, adolescents, and adults with autism spectrum disorders (ASD; American Speech-Language-Hearing Association, 2006c). This technical report summarizes

current knowledge derived from empirical research that provides a basis for understanding the core characteristics and challenges of ASD. This report specifically addresses the social communication needs of individuals with ASD, the critical role of the family, tools and strategies for screening, diagnosis and assessment for program planning, characteristics of empirically supported intervention approaches, and strategies. The report also addresses service delivery models and preparation needed by speech-language pathologists to work effectively with this population. A document providing guidelines for service delivery for the ASD population also was developed by the committee to provide further information and guidance on the implementation of the roles and responsibilities outlined in the position statement (American Speech-Language-Hearing Association, 2006a). The recommended *Knowledge and Skills Needed by Speech-Language Pathologists Serving Individuals With ASD* is presented in a companion document (American Speech-Language-Hearing Association, 2006b).

Terminology and Background

The recognition of autism spectrum disorders as a category of developmental disorders originated with Kanner's (1943) publication of a report on 11 children described as having "autistic disturbances of affective contact." Initially Kanner attributed the pattern of symptoms to a biologically based deficit, an innate disorder of affective contact, which he compared to other sensory deficits. Nevertheless, following the trends of the time, psychogenic explanations for the disorder became prominent well into the 1960s (Volkmar & Klin, 2000). Early research on children with ASD reflects a lack of consensus regarding diagnostic criteria and labels. Some professionals be-

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lieved that children evidencing the behaviors described by Kanner were exhibiting the earliest symptoms of schizophrenia; thus, early reports on children who likely would be diagnosed in the autism spectrum today often used diagnostic labels of *psychosis* or *childhood schizophrenia*. Indeed, in the first two editions of the *Diagnostic and Statistical Manual (DSM and DSM-II*; American Psychiatric Association, 1952, 1968, respectively), the only diagnostic label provided that could apply to children with ASD was *childhood schizophrenia* (Volkmar & Klin, 2005). The third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-III*; American Psychiatric Association, 1980) provided criteria for several childhood-onset pervasive developmental disorders, including infantile autism, residual autism (to account for the fact that children often improved in symptoms as they grew older), atypical autism, childhood-onset pervasive developmental disorder, and residual childhood-onset pervasive developmental disorder. The third edition revised (*DSM-III-R*; American Psychiatric Association, 1987) offered a reconceptualization of this category of disorders. Infantile autism became autistic disorder, to eliminate the implication that the disorder was only evidenced in young children. The criteria for a diagnosis of autistic disorder were broadened, and the categories of residual disorders were dropped in favor of the view that symptoms of the disorders might be expressed differently at different developmental ages. In addition, the distinctions made in the *DSM-III* related to age of onset were dropped in the *DSM-III-R*, leading to the elimination of the category childhood-onset pervasive developmental disorder. Thus, the *DSM-III-R* offered criteria for autistic disorder and a subthreshold variant, pervasive developmental disorder not otherwise specified (PDD-NOS).

Researchers and clinicians alike were challenged during the 1980s by the existence of varying diagnostic systems for pervasive developmental disorders, without a broad national or international consensus on diagnostic criteria (Volkmar & Klin, 2005). This situation made it difficult to interpret the generalizability of research findings and the extent to which conflicting outcomes in research were due to genuine failures to replicate results rather than differences in the way the population was defined. The World Health Organization (WHO) recognized a need to make extensive revisions to the psychiatric section of the *International Statistical Classification of Diseases* as it prepared the 10th edition of that manual (*ICD-10*; WHO, 1992). The *ICD-9* (WHO, 1978) had included infantile autism under the broader category of childhood psychotic conditions. There was considerable coordination in the development of the *ICD-10* and

the *DSM-IV* (American Psychiatric Association, 1994), yielding greater alignment of diagnostic criteria for ASD than had been true in earlier editions of the two manuals (Volkmar & Klin, 2005).

In the *DSM-IV*, the broad category of pervasive developmental disorders includes criteria for five different disorders: autistic disorder, Rett's disorder, childhood disintegrative disorder (also known as Heller's syndrome), Asperger's disorder, and PDD-NOS (known as atypical autism in *ICD-10*). Thus, this version of the *DSM* returned to a distinction based on age of onset, with symptoms required before the age of 3 years for a diagnosis of autistic disorder to be made. It also included Rett's disorder and Asperger's disorder in this category for the first time.

Rett's disorder was described initially by an Austrian physician, Andreas Rett, in a report in 1966 on 22 girls exhibiting the behaviors now associated with this syndrome. Because the publication was in German, however, the report did not receive widespread attention (Van Acker, Loncola, & Van Acker, 2005). Unaware of Rett's work, Hagberg published a report in 1980 on 16 girls exhibiting the same symptoms. At the time of the work on the *DSM-IV* (APA, 1994), professional consensus was established on the existence of Rett's disorder and the need to include it somewhere in the manual; however, there was some controversy over whether it should be in the pervasive developmental disorder category before the final decision to include it there (Volkmar & Klin, 2005). Since that time, genetic researchers have identified mutations in the MECP2 gene on the X chromosome as the genetic basis for Rett's disorder (Van Acker et al., 2005).

The history of Asperger's disorder as a recognized syndrome parallels that of Rett's disorder to some extent. Hans Asperger, an Austrian pediatrician, first described 4 children with autistic personality disorders in an article published in 1944; however, Asperger's work was not translated into English until 1991, and thus escaped widespread international attention in the years following its publication (Klin, McPartland, & Volkmar, 2005). The children that Asperger (1944) described differed to some extent from those described by Kanner (1943) in that their social difficulties were evidenced despite good verbal and cognitive skills. Criteria for Asperger's disorder were included in the *DSM-IV* despite considerable disagreement over whether it represented a distinct syndrome from high-functioning autism and also over what the diagnostic criteria should be. The literature continues to reflect a lack of professional consensus related to Asperger's disorder (Klin & Volkmar, 2003).

From the above history, ASD has evolved to refer to a group of disorders with symptoms that overlap to varying extents and in varying ways with the criterial features of autistic disorder (or autism). Diagnostic criteria for autistic disorder are offered in a number of sources. Currently the most commonly used diagnostic system is provided in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR; American Psychiatric Association, 2000)*. As in the *DSM-IV (APA, 1994)*, in the *DSM-IV-TR*, autistic disorder is a subcategory of pervasive developmental disorders, along with Asperger's disorder, childhood disintegrative disorder, Rett's disorder, and PDD-NOS. As described in the *DSM-IV-TR* (American Psychiatric Association, 2000), individuals with autistic disorder display a total of at least six features across three areas, as follows: (a) at least two symptoms of qualitative impairment in social interaction, including marked impairment in use of multiple nonverbal behaviors to regulate social interactions, failure to develop peer relationships appropriate to developmental level, lack of spontaneous seeking to show enjoyment or interests, or a lack of social emotional reciprocity; (b) at least one symptom of a qualitative impairment in communication, including a delay in or lack of spoken language in the absence of alternative communication compensation, marked impairment in conversational abilities in individuals who have adequate speech, stereotyped and repetitive use of language or idiosyncratic language, or lack of varied, spontaneous make-believe or social play appropriate to developmental level; and (c) at least one symptom reflecting a restricted range of interests and/or repetitive or stereotyped behaviors, including an encompassing preoccupation with something that is abnormal in intensity or focus, inflexible adherence to nonfunctional routines, stereotyped and repetitive motor movements, or persistent preoccupation with parts of objects. In addition to the characteristics listed above, the individual diagnosed with autistic disorder must have exhibited some delay or abnormal functioning in social interaction, language for social communication, or imaginative play before the age of 3 years. The term *ASD* reflects the assumption that the included disorders are related to each other through common symptoms and possibly through common etiological factors.

Considerably less agreement has emerged for the diagnosis of Asperger's disorder than for autistic disorder. According to current *DSM-IV-TR* criteria (American Psychiatric Association, 2000), individuals with Asperger's disorder will show qualitative impairments in social interaction, as well as restricted, repetitive stereotyped behaviors, interests, and activi-

ties (such as an abnormally intense preoccupation with restricted topics of interest or inflexible adherence to specific, nonfunctional routines). The severity of these impairments must interfere with important areas of functioning (such as in social activities, school, or a job). The individual must show no "clinically significant delays or deviance in language acquisition" (p. 80) (defined as having single words by 2 years, phrases by 3 years) and no clinically significant delays in cognitive development, self-help skills, or curiosity about the environment during childhood. In addition, if the individual meets criteria for another specific pervasive developmental disorder (e.g., autistic disorder), then he/she would be excluded from a diagnosis of Asperger's disorder, according to the *DSM-IV-TR* criteria. Other sources have specified additional clinical criteria for Asperger's disorder, including poor pragmatics, idiosyncratic language, impoverished imaginative play, and motor clumsiness; in addition, some sources allow for a history of speech and language delays (see Klin et al., 2005, for a review).

The *DSM-IV-TR* (American Psychiatric Association, 2000) criteria for Rett's disorder include apparently normal prenatal and perinatal development, along with normal psychomotor development through the first 5 months of life. This period of normal development then must be followed by a deceleration of head growth between the ages of 5 and 48 months, loss of previously acquired purposeful hand skills by 30 months along with the development of stereotyped hand movements, loss of social engagement early in the course of the disorder (although social engagement may develop later on), and severely impaired expressive and receptive language accompanied by severe psychomotor retardation. An international panel of experts reviewed the criteria for Rett's syndrome more recently; their consensus differed in a few significant ways from the *DSM-IV-TR* criteria, including allowing for the possibility of developmental delay from birth, specifying that the deceleration of head growth will occur in most but not all cases, and indicating that normal development may be evidenced for up to 18 months (see Van Acker et al., 2005).

The diagnosis of PDD-NOS is made in cases where an individual demonstrates social deficits similar to those specified in the criteria for a diagnosis of autistic disorder but fails to meet overall criteria for a diagnosis of any of the other pervasive developmental disorders (Towbin, 2005). Although individuals with PDD-NOS may display milder symptoms overall than individuals with autistic disorder, genetic studies suggest that there is an etiological relationship between autistic disorder and PDD-NOS as well as

symptom similarities. On the other hand, reliable differential diagnosis of PDD-NOS has proven to be challenging (Lord & Corsello, 2005; Towbin, 2005).

Within a public school setting, eligibility for services under the disability category of autism is based on the definition provided in the Individuals with Disabilities Education Improvement Act of 2004 (IDEA), as provided below:

Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age 3, which adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. The term does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance as defined by IDEA criterion.

A child who manifests the characteristics of "autism" after age 3 could be diagnosed as having "autism" if the criteria in the preceding paragraph are met. (34 C.F.R. § 300.7 [c] [1])

Individuals diagnosed with an ASD by means of other sources of clinical criteria, such as the *DSM-IV-TR* (American Psychiatric Association, 2000), are likely to be eligible for special education services under the category of autism as defined above, due to the common challenges and deficits in social communication functioning across the various disorders on the autism spectrum. To be eligible for special education services under the IDEA (2004) in school settings, a team that includes qualified professionals and the parent needs to determine whether the child has a disability (e.g., autism) and the educational needs of the child.

The professional community has not arrived at a complete consensus on what disorders are on the autism spectrum, although most professionals consider autistic disorder, Asperger's disorder, PDD-NOS, and childhood disintegrative disorder to be on the spectrum. Childhood disintegrative disorder is a rarely occurring disorder that involves regression after a period of apparently normal development for at least the first 2 years of life; the pooled prevalence estimate for childhood disintegrative disorder is 1.7/100,000 (Fombonne, 2002). Although the criterial symptoms include the same core areas as autism (qualitative impairments in social interaction, quali-

tative impairment in communication, and restricted, repetitive, and stereotyped patterns of behavior, interests, and activities), the later onset of the disorder and possible loss of motor skills or bowel or bladder control raise the possibility of etiological factors that may distinguish the disorder from those that emerge earlier in life; however, the rarity of the disorder makes research on the specific nature of childhood disintegrative disorder challenging. A genetic anomaly accounting for 80% or more of cases displaying the developmental and behavioral symptoms of Rett's disorder was identified in 1999 (see Jellinger, 2003). Because of this advance in genetics research, Rett's disorder can now be studied as a specific biologically marked syndrome and is, therefore, no longer considered by some members of the professional community as within the autism spectrum. Some research has focused on the characteristics of autism exhibited by individuals with Rett's disorder (e.g., Mount, Charman, Hastings, Reilly, & Cass, 2003; Mount, Hastings, Reilly, Cass, & Charman, 2003; Sandberg, Ehlers, Hapberg, & Gillberg, 2000) and has reported that although some similarities in symptoms exist, individuals with Rett's disorder also show distinct patterns in both symptoms and course of development compared with individuals with autism. Refer to the companion guidelines document for additional clarification on these diagnostic subtypes (American Speech-Language-Hearing Association, 2006a).

Prevalence

Prevalence estimates for ASD vary from study to study, possibly due to methodological differences in sampling and/or geographical variability in identification and diagnosis. Current prevalence estimates for ASD in the United States are 34 per 10,000 or 0.34% based on a recently reported study by the Center for Disease Control and Prevention (Yeargin-Allsopp et al., 2003). In several studies conducted in Europe, prevalence estimates of PDD or ASD are 60 per 10,000 or 0.6% (Chakrabarti & Fombonne, 2001, 2005), which likely reflect a better capacity to track disabilities in the education and health care systems in Europe. A recent extensive review of research concluded that a conservative or median estimate of autistic disorder is 2.5/10,000; and that the estimate for PDD-NOS is 15/10,000 (Fombonne, 2003). Large epidemiologic studies have reported increases from estimates of 2 to 5 per 10,000 for autistic disorder in the 1970s to 6 to 22 per 10,000 by the turn of the century (Chakrabarti & Fombonne, 2005; National Research Council, 2001). The reasons for the increase in prevalence are still being debated. Some of the increase is unquestionably due to broadened diagnostic criteria

in the *DSM-IV* and *DSM-IV-TR*, compared with the *DSM-III*, the 1980 edition of the manual in which criteria for a diagnosis of autism were first included (National Research Council, 2001). A second factor affecting the increase in prevalence is the greater awareness and thus better ascertainment of individuals in the population who have ASD (National Research Council, 2001). One source of data that has been cited as a cause for alarm is the increased numbers of children served through the IDEA in the category of autism; however, this category did not exist in reporting of special education services until the passage of IDEA in 1991.

Gernsbacher, Dawson, and Goldsmith (2004) concluded that the large increase in number of children reported with autism under IDEA is consistent with the increased reporting seen when other reporting categories are introduced, such as traumatic brain injury. In addition, these authors noted that no state yet reports as large a number of children with autism as expected based on current prevalence estimates of the disorder. Scientists and lay advocates continue to debate whether these factors account fully for the increased prevalence of ASD or whether other factors, such as environmental toxins, may be contributing to the increase (e.g., Blaxill, 2004; Geier & Geier, 2004; Gernsbacher et al., 2004). A recently published study conducted in the United Kingdom reported on an epidemiological study of the prevalence of ASD in a 1996–1998 birth cohort, which could be compared directly to an earlier study in the same geographical region of a 1992–1995 birth cohort (Chakrabarti & Fombonne, 2005). The investigators found no increased prevalence of pervasive developmental disorders in the later birth cohort and reported a stable prevalence of approximately 60 per 10,000 for all pervasive developmental disorders. Based on a review of large epidemiological studies using systematic screening and diagnostic procedures and criteria, Rutter (2005) concluded the following: “The increase is largely a consequence of improved ascertainment and a considerable broadening of the diagnostic concept. However, a true risk due to some, as yet to be identified, environmental risk factor cannot be ruled out” (p. 434).

Etiology and Related Medical Conditions

ASDs are diagnosed based on behavioral symptoms, without reference to etiology. Considerable recent research has been devoted to investigations of etiological factors, however. Genetic research has convincingly demonstrated strong genetic influences associated with autism and the broader behavioral phenotype (Bailey, Palferman, Heavey, & Le Couteur, 1998). A number of candidate genes associated with

susceptibility to autism have been identified, and the accumulated findings have resulted in the formulation of models suggesting the disorder arises from complex interactions involving multiple genes (from as few as 3–4 to as many as 10; Volkmar, Lord, Bailey, Schultz, & Klin, 2004). At another level of analysis, many studies have reported neurobiological differences associated with a diagnosis of ASD, including replicated findings of decreased white matter compared to gray matter in the brain by adolescence, anatomical and functional differences in the limbic system, hypoactivation in the fusiform face area during face recognition tasks, and anatomical and functional differences in the cerebellum (Volkmar et al., 2004).

Core Characteristics and Challenges in Autism Spectrum Disorders

The population with ASD presents with tremendous heterogeneity. However, common characteristics and challenges compromise the development of critical social communication skills. The core features of ASD, which are discussed below, are impairments in aspects of joint attention (e.g., social orienting, establishing shared attention, monitoring emotional states, and considering another’s intentions), social reciprocity (e.g., initiating bids for interaction, maintaining interactions by taking turns, and providing contingent responses to bids for interaction initiated by others), language and related cognitive skills (e.g., understanding and using nonverbal and verbal communication, symbolic play, literacy skills, and executive functioning—the ability to problem solve and self-monitor future, goal-directed, behavior), and behavior and emotional regulation (e.g., effectively regulating one’s emotional state and behavior while focusing attention to salient aspects of the environment and engaging in social interaction). By their very nature, disabilities with a social component are transactional (i.e., there is a back-and-forth influence between the individual with ASD and his/her communication partner (J. E. McLean & Snyder-McLean, 1978; L. K. McLean, 1990)). The core social communication deficit of individuals with ASD creates a transactional dynamic of social exclusion, which may be even more disabling than the primary biological deficit (Schuler & Wolfberg, 2000). When social communication challenges are present, those who interact with the individual also face significant challenges in learning to modify their interactive style and the environment to ensure successful communicative exchanges. Thus, challenges are evident for both the individual with ASD as well as his or her communication partners.

Social Communication

Joint attention. In typical development, infants demonstrate a predisposition to orient to social stimuli in the environment by focusing on a caregiver's eyes and direction of gaze (Haith, Bergman, & Moore, 1979; Symons, Hains, & Muir, 1998), facial expressions (Bryant, 1991; Bushnell, Sai, & Mullin, 1989), voice (Eisenberg & Marmarou, 1981; Walker, 1982), and gestures (Mundy & Neal, 2001). These early inclinations support a developing child's joint attention abilities, such as recognizing another's visual line of regard, directing another's attention to objects or events of interest, and determining another's intentions (Dawson et al., 2004). Likewise, through maturation, a child learns to modify language use based on knowledge of a communication partner's experiences and, as a result, will begin to share ideas, internal states, and plans with others when relevant (Baron-Cohen, 1988; Carpenter & Tomasello, 2000).

Reading another's eye gaze, facial expressions, gestures, and intonation also enables typically developing children to develop the capacity to infer the emotional states of others. With these early developing achievements, a child learns to predict how one's own actions will affect the emotional response of others. Initially, a child may reference the emotional state of others to judge whether a new event should be perceived with joy or fear. Later in development, a child's communication and language may be used intentionally to seek specific emotional responses from others (e.g., seeking comfort, initiating social games, sharing experiences, praising others, and sharing empathy). More advanced self-monitoring skills also rely on these early achievements, as the ability to gauge the social impact of one's actions requires an awareness of how those actions influence the emotional state of others.

For individuals with ASD, challenges in orienting to social stimuli and acquiring joint attention skills are evident from a very early age and provide barriers to the development of early communicative intent, social functions of communication, and language acquisition. Young children with ASD show difficulties with early achievements in shared attention, as evidenced by a limited ability to notice people in their environment and/or respond to a caregiver's voice (Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998; Klin, 1991, 1992; Lord, 1995). Likewise, individuals with ASD often demonstrate a limited ability to follow another's focus of attention, shift gaze between people and objects, and follow what others are referencing with gestures (Dawson, Hill, Spencer, Galpert, & Watson, 1990; Mundy & Neal, 2001; Wetherby,

Prizant, & Hutchinson, 1998). Difficulties with these early achievements of shared attention compromise the ability to direct another's attention to share an interesting item or event (e.g., commenting, requesting information, and sharing experiences; Dawson et al., 2004; Wetherby et al., 1998). Eye-tracking technology has allowed researchers to observe the visual focus of an individual with more objectivity using dynamic, fast-paced social interactions captured on video. In recent studies incorporating these methods, even very high-functioning individuals with ASD have demonstrated visual neglect to cues of attentional focus such as shifts in eye gaze and the use of pointing gestures (Klin, Jones, Schultz, Volkmar, & Cohen, 2002).

Sharing emotions and inferring the emotional state of others are also core features of ASD. Keeping in mind individual variability, individuals with ASD tend to display less attention than their typically developing peers to emotional displays of distress or discomfort (Dawson et al., 2004; Sigman, Kasari, Kwon, & Yirmiya, 1992), and they tend to display less shared positive affect (Dawson et al., 1990; Wetherby et al., 1998). Likewise, less emotional reciprocity is noted following praise (Kasari, Sigman, Baumgartner, & Stipek, 1993). As communicative intent develops, individuals with ASD tend to display a restricted range of communicative functions to seek specific emotional responses from others. Thus, communication may initially occur for requesting and protesting objects or activities, whereas the functions of seeking comfort, initiating social games, and praising others may be restricted or later developing, and commenting to share enjoyment and interests may be even later developing or absent (Wetherby, 1986; Wetherby et al., 1998; Wetherby & Prutting, 1984).

While higher functioning individuals with ASD may demonstrate an ability to identify facial expressions or other behaviors indicative of emotional states (e.g., crying, smiling, and a clenched fist) when fixed in place, challenges are particularly evident in natural social interactions (Klin, 2000; Klin et al., 2002; Yirmiya, Sigman, Kasari, & Mundy, 1992). In these latter situations, individuals with ASD are likely to miss emotional cues, tending to fixate on the lower half of the face (i.e., the mouth) as opposed to the upper half (i.e., the eyes; Klin et al., 2002). This may lead to a limited awareness of causal factors for these emotional states, limited empathetic reactions to emotional displays, and limited use of the emotions of others to guide behavior in social interactions (Capps, Yirmiya, & Sigman, 1992). Müller and Schuler (in press) compared verbal behaviors that marked emotional states of 13 children with high-functioning autism or Asperger's disorder interact-

ing with family members at dinner with those of typically developing children of the same age. Consistent with earlier research, this study found that children with high-functioning autism or Asperger's disorder are no less likely than their typically developing peers to mark affect. In fact, they found that children with high-functioning autism and Asperger's disorder engaged in a higher proportion of affect marking and provided more affective explanations than typically developing children but provided less initiations or talk about the affective states of others. The authors concluded that children with high-functioning autism or Asperger's disorder, while perhaps less developmentally sophisticated than their typically developing peers in terms of affective understanding, are nonetheless willing to engage in discussions about affective responses in the context of supportive interaction styles of family members. Furthermore, the fact that the same children were found to offer less initiations or talk about the affective states of others may speak to their ongoing challenges in this domain and the need for further investigation of the conditions that promote reciprocity in the expression of affect.

Social reciprocity. It is well documented that children who both initiate and follow the attentional focus of communication partners are most likely to develop sophisticated social communication and language (Carpenter & Tomasello, 2000). Challenges in establishing and maintaining social reciprocity are, however, a core feature of ASD and, thus, limit opportunities for individuals with ASD to initiate conventional communication, respond to the models of others, and acquire more sophisticated language. Individuals with ASD often present with a developmental history marked by a decreased frequency of spontaneous bids for communication (Stone & Caro-Martinez, 1990; Wetherby et al., 1998) and a reliance on more structured situations to engage in conversational exchanges (Landry & Loveland, 1989). Early on in development, these challenges are noted in the limited quantity of gestures used for communication, limited back-and-forth exchanges in interactions, missing breakdowns in communication, and a more passive conversational style. Later on in development, more able individuals with ASD continue to demonstrate challenges with (a) providing relevant remarks in response to the topic initiations of others, (b) providing appropriate expansion comments, (c) requesting information to maintain the conversational exchange, and (d) providing essential background information (Lord & Paul, 1997). Individuals with ASD at more advanced developmental stages may also demonstrate challenges with initiating and maintaining conversations that are sensitive to the social context and the interests of others. Often, top-

ics of keen interest dominate conversations, and the relevance of a topic to a conversational partner may not be considered (Klin & Volkmar, 1997).

Language and Related Cognitive Skills

Language and related cognitive skills, which reflect an underlying capacity to symbolize and learn a rule-governed system, enable an individual to request, protest, share experiences, and exchange ideas with others through modalities of communication that have shared meanings. Thus, through an understanding and use of conventional gestures, spoken and printed words, oral and written language, and symbolic play, individuals can clarify intentions and follow the intentions of a communication partner without having to rely on the context (Wetherby, Prizant, & Schuler, 2000). Infants and toddlers will typically develop the use of gestures with shared meanings (e.g., giving may represent *will you help?* and pointing may represent *will you look?*) and will then move from producing words and word combinations to using sentence constructions that incorporate shared rules of grammar. Grammatical forms are symbolic tools that clarify meanings to a listener (e.g., possessives clarify the owner of an item being discussed and verb tenses clarify when the event being discussed took place). Likewise, with the use of more complex sentences and syntactic tools (e.g., conjunctions and embedded clauses), language becomes more precise and descriptive. Complex sentence constructions enable an individual to understand and communicate about past and future events, provide a listener with adequate background information, and clarify not only one's emotional state but contributing causal factors. An understanding and use of language and symbolic play eventually provide a medium to share one's own personal experiences, learn about the experiences of others, and engage in executive functions such as problem solving and self-monitoring future, goal-directed, behavior.

Understanding and use of nonverbal communication. Individuals with ASD often use a limited range of conventional gestures and vocalizations in the early stages of communication development (Wetherby et al., 2000). A reliance on presymbolic gestures (i.e., leading, pulling, or manipulating another's hand) and reenactment strategies (e.g., using gestures or words associated with an event) may be noted, while the use of conventional gestures such as showing, waving, pointing, and shaking one's head may be delayed or absent (Stone & Caro-Martinez, 1990; Wetherby et al., 1998). It is also common for individuals with ASD to develop problem behaviors to communicate (e.g., screeching, hitting, and/or fleeing from an undesired activity) in lieu of acquiring more conventional ges-

tures or symbolic communication as effective strategies for protesting, exerting social control, and emotional regulation (Fox, Dunlap, & Buschbacher, 2000).

Later on in development, an appreciation of nonverbal communication typically fosters an awareness of subtle intentions of a communication partner, such as the use of sarcasm and other nonliteral meanings. Nevertheless, for individuals with ASD, comprehension and use of the symbolic messages associated with nonverbal communication remain compromised, particularly within fast-paced, social interactions (Klin, 2000; Klin et al., 2002; Yirmiya et al., 1992). Thus, individuals with ASD who develop verbal or symbolic communication adhere to literal use and interpretation of words. Additionally, individuals with ASD tend to present with either monotone intonation patterns or unusual prosody (Fay & Schuler, 1980) and have difficulties using intonation cues to support comprehension of another's intentions (see Lord & Paul, 1997, for a review).

Symbolic play. Children first learn to interact with objects using sensorimotor exploration and trial-and-error problem solving involving visuospatial reasoning. As they begin to orient to social stimuli, shift gaze between people and objects, and infer the intentions of others, however, the capacity to learn by observing others and representing these social actions and activities typically develops. The lack of varied, spontaneous make-believe and functional play is a characteristic of ASD that is so central to the disability that it is included in the diagnostic criteria (American Psychiatric Association, 1994). Early on in development, individuals with ASD may demonstrate limited functional use of objects, secondary to difficulties with orienting toward their caregivers and with imitation of the actions of others (Wetherby & Prutting, 1984). Later on in development, some individuals with ASD may develop symbolic play abilities; however, the quality of play may be repetitive and inflexible (see, e.g., Wing, Gould, Yeates, & Brierly, 1977). The individual with ASD may have considerable difficulty incorporating themes or modifications introduced by communication partners (Wetherby & Prutting, 1984). Thus, symbolic play is rarely observed to be truly cooperative and coconstructed in interactive situations. Difficulty with functional and symbolic play not only affects peer relationships in early childhood settings but also compromises the ability to enact social sequences in a representational manner, a capacity that allows individuals to visualize an event before it takes place and even prepare for unfamiliar or potentially distressful situations. This area of development (i.e., executive functioning) is discussed in further detail below.

Understanding and use of verbal or symbolic communication. One of the most notable barriers to achieving competence through verbal or symbolic communication arises from the presence of speech-sound production difficulties. Approximately one-third to one-half of individuals with ASD present with significant difficulty using speech as a functional and effective means of communication. In these individuals, it is not uncommon for vocal attempts to be of limited intelligibility due to difficulties producing a variety of consonant sounds and using more complex syllable structures, such as those in multisyllabic words. The nature of these difficulties is not well documented in the literature; however, underlying difficulties may include challenges with oromotor planning and/or delays in phonological development (Bryson, 1997; Lord & Paul, 1997; National Research Council, 2001). For the majority of individuals with ASD, regardless of their capacity for speech, the acquisition of language is compromised by impairments in joint attention, difficulty generalizing the conventional meaning of words outside of the specific contexts where they were learned, and a reliance on echolalia. Thus, difficulties with the acquisition of language are not solely related to challenges with an individual's oromotor competence and/or speech development.

Challenges in social communication often affect the development of language in individuals with ASD, as evidenced in restricted semantic development and difficulties with the development of more creative and generative language (Prizant, Schuler, Wetherby, & Rydell, 1997). For an individual with ASD who is at an emerging language stage, vocabulary development often remains limited to those word forms that are learned by a communication partner following the individual's attentional focus (e.g., nouns or object labels; Carpenter & Tomasello, 2000). Symbolic word forms for referents other than nouns (e.g., action words, modifiers, and relational words) are often later developing in ASD, as these semantic meanings require an ability to determine another's focus of attention, determine his or her intentions, and simultaneously process the action words, modifiers, and other relational words that are being modeled (Carpenter & Tomasello, 2000). Likewise, difficulties with orienting to social stimuli may be associated with a strong preference for environmental cues or static visual cues over social information and may contribute, in part, to a prolonged reliance on inflexible episodic associations. In other words, an individual with ASD may hear a word or a *chunk* of language and associate this word or *borrowed* phrase with a specific experience or event rather than understanding the conventional meaning of the word or

phrase and how it may be applicable across similar contexts. The situation-specific learning conditions of an episode (e.g., a visual cue in the environment or a verbal cue of a communication partner) may support word recall rather than true semantic understanding of the relationships between the words and the events (Prizant et al., 1997; Tsatsanis, 2004).

Due to this reliance on episodic associations, strengths in rote auditory memory, and weaknesses in language comprehension, individuals with ASD who acquire speech as a primary modality of communication often develop echolalia as a primary means of communication (Prizant et al., 1997). The term *echolalia* refers to the immediate repetition (i.e., immediate echolalia) or delayed repetition (i.e., delayed echolalia) of the speech produced by others (Fay & Schuler, 1980; Prizant et al., 1997; Rydell & Prizant, 1995; Schuler & Prizant, 1985). Prizant (1983) suggested that while individuals with ASD may initially use echolalia with little evidence of comprehension or communicative intent, echolalia is often used for a range of communicative functions as that individual progresses in language competence. Additionally, as an individual develops greater comprehension and social communicative competence, more creative and spontaneously generated utterances will often emerge (Prizant, 1983).

For those individuals with ASD who acquire verbal and symbolic language as a primary means of communication, ongoing challenges in understanding and use of language are frequently evident. Expressive abilities often improve more significantly than receptive abilities (Paul & Cohen, 1984), and for some individuals with ASD, the use of echolalia may persist into adulthood, a pattern that compromises social communicative competence, particularly with unfamiliar communication partners (Rydell & Prizant, 1995). These findings are consistent with recent studies incorporating technology such as functional MRI, which are suggestive of significant neurological differences in language processing in individuals with high-functioning autism (Just, Cherkassky, Keller, & Minshew, 2004). For individuals with ASD that demonstrate relative strengths in verbal and symbolic language, such as those with Asperger's disorder, difficulties using more sophisticated language as a means to clarify intentions remain common (Volkmar & Klin, 2000). Although individuals with Asperger's disorder may demonstrate strong competencies in language form and vocabulary, the use of more sophisticated syntax to provide background information for one's listener and show relationships between sentences in conversational discourse is often compromised in conversation (Volkmar, Klin, Schultz, Rubin, & Bronen, 2000).

Literacy skills. The printed word is a modality of communication that is central to social and communicative competence, as both reading and writing play a primary role in the ability to function effectively in academic and vocational settings and participate in social cultural rituals and routines (e.g., reading books and writing letters/e-mails) that contribute to social membership (American Speech-Language-Hearing Association, 2001a, 2001b). In typical development, this achievement is fostered in the prelinguistic stages as children orient to social stimuli and engage in social experiences involving the printed word (e.g., sharing books and reading stories with caregivers). Emergent literacy skills in prelinguistic children include the functional use of books and book knowledge (i.e., knowing how a book is held, turning pages, understanding that books share information, pointing to pictures in books, and listening to simple stories; National Research Council, Committee on the Prevention of Reading Difficulties in Young Children, Commission on Behavioral and Social Sciences and Education, 1999). At emerging language stages, typical children begin to recognize that print relates to spoken language and reads from left to right, understand sequences of events in stories, attend to beginning and rhyming sounds, and name alphabet letters (Adams, 1990; National Research Council, Committee on the Prevention of Reading Difficulties in Young Children, Commission on Behavioral and Social Sciences and Education, 1999). They also understand and use early story grammar and develop phonological awareness and knowledge of the alphabet. As a child's literacy skills develop along with their comprehension and use of spoken language, he/she can demonstrate story grammar knowledge, decoding, letter-sound correspondence, and expanding literacy skills (e.g., reading comprehension and written expression; Mirenda & Erickson, 2000).

The development of literacy in individuals with ASD may be marked by an unusual scatter of skill development, with relative strengths in reading decoding in the face of challenges in observing and imitating the functional use of books, story grammar, and reading comprehension (Aram, 1997). Due to strengths in visuospatial perception and rote episodic associations, individuals with ASD may learn phonological rules and detect patterns in words, thereby allowing for the acquisition of a sight word vocabulary, often without comprehension of the printed words. This pattern may be referred to as *hyperlexia* and has been noted in individuals with a range of disabilities; however, it is most commonly observed in individuals with ASD (see Mirenda & Erickson, 2000, for a review).

As individuals with ASD develop an understanding of language, their literacy and reading comprehension typically improve. Nevertheless, core challenges in understanding more complex language, joint attention, and social reciprocity are correlated with compromised reading comprehension and written language development (Carpenter & Tomasello, 2000; Mirenda & Erickson, 2000). Even those individuals with ASD with more advanced language skills face challenges with understanding and using figurative language, understanding and including mental states in written narratives, and using more varied syntactic forms to clarify their intentions to an unfamiliar reader. As discussed by Baron-Cohen, Leslie, and Frith (1985) in their comparison of mechanical, behavioral, and intentional understanding of picture stories in children with ASD, individuals with ASD seem to be particularly challenged when comprehension of text and/or picture sequences requires the reader to make inferences about the mental states of others (for an insightful discussion, see, e.g., Frith, 1989) rather than the physical properties of things. The common observations of individuals with ASD preferring encyclopedias over novels may serve to underscore these differences.

Executive functioning. In typical development, *executive functioning* refers to the ability to problem solve and self-monitor future, goal-directed, behavior (Tsatsanis, 2004). As noted above, the development of symbolic language contributes to these problem-solving skills, as individuals begin to organize their actions within a given activity using language (e.g., “first...then”) and begin to prepare for upcoming activities. Executive functioning, however, also relies on metacognition, which relates to the ability to reflect on one’s experiences and behavior and the perspective of others to plan, prepare, execute, and negotiate in both familiar and new and changing situations. Challenges in executive functioning are often manifested in day-to-day functioning as difficulties with self-organization. Areas that may be affected include, but are not limited to, formulation of thoughts or ideas, problem solving, and planning for future events. For individuals with ASD, managing complex information, particularly in novel situations, is compromised by challenges in cognitive flexibility and/or a deficient understanding of novel concepts (Goldstein, Johnson, & Minshew, 2001; Minshew, Meyer, & Goldstein, 2002; Ozonoff & McEvoy, 1994; Ozonoff, Pennington, & Rogers, 1991; see also Tsatsanis, 2004). Individuals with ASD may use rules to guide their behavior in certain situations but not have the capacity to derive new problem-solving strategies within novel situations (Goldstein et al., 2001; Minshew et al., 2002). Thus, individuals with

ASD may appear perseverative, they may persist in using a strategy even when unsuccessful in previous situations, and they may rely on verbal cues to manage their behavior in more novel social situations (Tsatsanis, 2004).

Behavior and Emotional Regulation

Developmental milestones in emotional regulation have a significant impact on the ability to maintain social engagement, attend to salient aspects of the social environment, and effectively regulate one’s emotional state and behavior to support effective communication (National Research Council, 2000). Although difficulties with determining the intentions of others, emotional expression, and language acquisition are widely discussed, the impact of these challenges on the development of emotional regulation is often underestimated in individuals with ASD. Actively participating and remaining engaged in a social situation are dependent on the ability to perceive social events accurately and predict social behavior in others. As the capacity to determine the intents of others is a core challenge, individuals with ASD frequently misinterpret social events and/or fail to recognize assistance offered by others, a pattern that often leads to increased anxiety and/or social withdrawal. Additionally, neurophysiological factors, such as the presence of sensory processing challenges and difficulties determining the salience or irrelevance of environmental information, further compromise emotional regulation in individuals with ASD (Anzalone & Williamson, 2000; Kientz & Dunn, 1997; Whitman, 2004).

Typically developing children develop a range of conventional strategies for self-regulation, including the use of simple motor actions (e.g., carrying a security blanket, playing with a preferred toy, and retreating to one’s room when overwhelmed). With the development of symbolic language, individuals begin to organize their actions within a given activity (e.g., “first...then”) and to prepare for upcoming activities during transitions (Vygotsky, 1978). Furthermore, language is used to request breaks and assistance from others (Prizant et al., 1997). The ability to use language to express one’s emotional state as well as describe the emotional state and/or opinions of others also enables the development of more advanced negotiation and collaboration skills, allowing for the development of coping strategies within interactions with peers (Prizant, Wetherby, Rubin & Laurent, 2003).

Individuals with ASD often continue to use early developing and/or idiosyncratic strategies for self-regulation far beyond early childhood due a limited ability to benefit from models provided by others.

Immature patterns of behavior (e.g., chewing on clothing, carrying unusual objects across settings, vocal play, and rocking) may be observed during milder instances of emotional dysregulation, while aggression, tantrums, and bolting from the social setting are examples of unconventional behavioral strategies and emotional expressions that may be observed during extreme periods of dysregulation. Similar challenges have been noted in the use of language to guide behavior, collaborate with others, and regulate emotional state (Klin & Volkmar, 2003; Prizant et al., 1997). A compromised ability to benefit from models provided by others and a reliance on early developing strategies often result in the development of idiosyncratic language for self-regulation (e.g., repetitively initiating a topic of special interest to cope with social anxiety and reciting the lines of a favorite movie or book when faced with distressful social circumstances; Rydell & Prizant, 1995). Due to the unusual nature of these self-regulatory strategies, communication partners may impose punitive measures, leading to increased frustration on the part of the individual and/or diminished self-esteem.

Sensory sensitivities, such as hyperreactivity to environmental stimuli (e.g., environmental noise and visual clutter) and social stimuli (e.g., being touched) have been noted in the literature describing the behavioral profiles of individuals with ASD (Anzalone & Williamson, 2000; Kientz & Dunn, 1997; Whitman, 2004). With respect to behavior and emotional regulation, these additional factors may contribute to maladaptive patterns of behavior such as refusing to make a transition into a new social setting and excessive rigidity even within familiar routines. The emotional distress caused by the aversive stimuli coupled with social communication challenges (e.g., limited use of language to self-talk and express emotions and limited use of caregiver models for coping) may also lead to strong emotional reactions to seemingly harmless events. Finally, more contemporary research has noted a relationship between children who present with sensitivity to environmental stimuli early on in development and social withdrawal and anxiety later in life, placing individuals with ASD at risk for compromised mental health (Kagan & Snidman, 1991; Kagan, Snidman, & Arcus, 1998).

Sensory and Feeding Issues

Kanner's (1943) report on autism described unusual sensory features among the children he had seen, such as fascinations with some sensory aspects of objects and events and episodes of distress that seemed to be elicited by other sensory experiences. Clinical descriptions of unusual sensory features in

this population have been frequent in the literature in the time since Kanner's original report, but there is a dearth of research regarding the prevalence, origins, or significance of these features. Unusual sensory features are not thought to be universal among children with ASD (Baranek, 2002; Dawson & Watling, 2000), but reported prevalence rates vary widely depending on study methodology, ages of participants, and the behaviors sampled (Baranek, David, Poe, Stone, & Watson, in press). Several investigations have produced replicated findings that unusual sensory features are more common among children with ASD than among typically developing children (Kientz & Dunn, 1997; Ornitz, 1987; Talay-Ongan & Wood, 2000; Watling, Deitz, & White, 2001). On the other hand, children with other disorders, such as attention-deficit/hyperactivity disorder (Ermer & Dunn, 1998) and fragile X (Rogers, Hepburn, & Wehner, 2003), also show more sensory features than children developing typically. In two studies comparing children with autism with those with nonspecific developmental delays, researchers found that parents reported more sensory features among children with autism (Lord, 1995; Rogers et al., 2003), whereas a third such study (Stone & Hogan, 1993) failed to find group differences. Thus, the available research has not supported the idea that unusual sensory features are specific to ASD and is inconsistent regarding whether these features are more frequent among individuals with ASD.

Among varied terms for the types of unusual sensory features seen in children with ASD, *hyperresponsive* and *hypo-responsive* have been used to capture patterns of behaviors related to sensory experiences (Baranek, 2002; O'Neill & Jones, 1997). Hyperresponsivity is evidenced by behavioral reactions to sensory stimuli that are more intense or exaggerated, based on usual reactions seen in the general population (e.g., covering ears in response to the noise of a vacuum cleaner; blinking or squinting eyes when looking at a moderately bright light). Hyporesponsivity is characterized by a lack of response to sensory stimuli, or a less intense than expected response (e.g., a lack of reaction to stimuli that normally would be experienced as painful or a lack of orienting when one's name is called). These sensory patterns are both exhibited among individuals with ASD and may coexist in the same individual (Greenspan & Wieder, 1997; Hirstein, Iversen, & Ramachandran, 2001). Another key aspect of sensory stimuli with potential relevance to children with ASD is whether the stimuli are predominantly social or nonsocial in nature. Recent research based on reports from parents of children with autistic disorder, other ASDs, non-ASD developmental disabilities (DDs),

and typical development has reported that children in the two ASD groups and children with other DDs exhibited more features than typically developing children in the categories of hyperresponsive/social, hyperresponsive/nonsocial, and hyporesponsive/social. In addition, children in the two ASD groups showed more features compared with typically developing children in the category of hyporesponsive/nonsocial. Parents of children in the autistic disorder group reported more hyporesponsive features in their children than did parents of children in the DD group, in response to both social and nonsocial stimuli. Consistent with previous research, not all parents of children with ASD endorsed unusual sensory features in their children. This research suggests that unusual sensory features are neither universal nor specific to individuals with ASD but that individuals with ASD are more likely to show patterns of hyporesponsivity compared with individuals with other DDs, whether the stimuli are social or nonsocial.

Another, possibly related, area of behaviors reported among children with ASD is feeding problems. This is of particular interest to the speech-language pathologist but is an area in which the research evidence specific to ASD is meager. Some of the problems reported among children with ASD include patterns of food acceptance or rejection based on the manner in which the food is presented (e.g., only consuming things given in a bottle beyond the expected age) or on food texture (e.g., avoiding crunchy foods; Ahearn, Castine, Nault, & Green, 2001). Recent research suggests that children with ASD between the ages of 5 and 12 years exhibit more feeding problems than those without ASD (Schreck, Williams, & Smith, 2004). The comparison group in this study was matched for chronological age with the children with ASD, but no explicit effort was made to recruit children with developmental disabilities; thus, the comparison group is assumed to consist largely of children developing typically. Parents of children with ASD reported that their children ate a smaller variety of foods within each of five food types (i.e., starches, proteins, vegetables, fruits, and dairy), even though the general family diet in each of the two groups was comparably varied.

Ho, Eaves, and Peabody (1997) examined the significance of eating habits for nutrition among a group of 54 school-age children with ASD in Canada and found that although all children had adequate intake of protein, only 4 children had diets meeting the recommendations of the Canadian Food Guide. In comparison to the typical Canadian child, the children with ASD consumed more carbohydrates and less fat, with a similar overall caloric intake. Although only 5

of the children were overeating, 23 of them were above 120% of their ideal body weight. This finding appeared to be related to a low activity level and severity of autism. In a different study of body weight, Bölte, Özkara, and Poustka (2002) examined a German sample of 103 individuals with autism or Asperger's disorder whose ages ranged from 10 to 40 years. They found 20% of their sample to be at the 5th percentile or below for body mass index and only 8% to have a body mass index at the 95th percentile or higher. Low body weight was related to hyperactivity, but not to measures of the severity of autism symptoms or to intelligence level. The study did not examine the relation of weight to observed or reported feeding problems. Nevertheless, both nutrition and feeding pose significant challenges that are likely to affect clinical decision making for individuals with ASD.

Challenges of the Communication Partner

Those who interact with the individual with ASD face the constant challenge of modifying their interactive style and the environment in order to ensure competent communicative exchanges. Core challenges are not, in fact, isolated to the individual with a social disability. Family members, teachers, speech-language pathologists, and other service providers are faced with the challenge of learning to respond to an individual's subtle bids for communication, interpreting the functions of problem behavior, and modifying the environment to foster active, social engagement. Likewise, peers often feel ineffective when engaged in social exchanges with an individual with ASD and may avoid that individual and/or react in a negative way to social overtures (e.g., teasing or bullying). These factors can hasten the development of social isolation (Schuler & Wolfberg, 2000), and when maladaptive behavioral outbursts are misperceived as willful or defiant, the individual with ASD's inability to cope and express intentions or feelings in more socially appropriate ways may be overlooked. When this occurs, the very individuals who need the most support and/or practice in social and communication contexts often have the least opportunities to do so (Lord, 1984).

Philosophical Perspective on the Important Role of the Speech-Language Pathologist Serving Individuals With Autism Spectrum Disorders

It is ASHA's position that speech-language pathologists play a critical role in screening, diagnosing, and enhancing the social communication development and quality of life of children, adolescents, and

adults with ASD (see position statement; American Speech-Language-Hearing Association, 2006c). The core features of ASD include impairments in reciprocal social interaction, impairments in verbal and nonverbal communication, and restricted range of interests and activities, which are due to neurobiological factors. Integral to the diagnostic criteria, all individuals with ASD are challenged in the area of social communication. Thus, while many individuals with ASD have difficulty acquiring the form and content of language and/or nonspeech communication systems, all have needs in acquiring appropriate social use of communication. Therefore, problems in use of language and communication are overarching because ASD is a primary social communication disability. These challenges result in far-reaching problems including joint attention, shared enjoyment, social reciprocity in nonverbal as well as verbal interactions, mutually satisfying play and peer interaction, comprehension of others' intentions, and emotional regulation. Due to the nature of ASD, family members, peers, and other communication partners encounter barriers in their efforts to communicate and interact with individuals with ASD. Therefore, the speech-language pathologist's role is critical in supporting the child, the environment, and the communication partner to maximize opportunities for interaction to overcome barriers that would lead to ever decreasing opportunities and social isolation if left unmitigated, as laid out in the following principles. Due to the unique learning style and social communication challenges seen in individuals with ASD, speech-language pathologists should participate in preservice and continuing education designed to prepare and enhance the knowledge and skills of professionals who provide services for individuals with ASD. To serve individuals with ASD effectively, speech-language pathologists should be informed of the current research and/or participate in and advance the knowledge base related to ASD.

Principle 1. Speech-language pathologists play an important role in promoting social communication skills that further the independence and self-advocacy of individuals with ASD.

There is great heterogeneity in this population, evident in a broad range of cognitive, social, communication, motor, and adaptive abilities. Some individuals with ASD also have mental retardation (MR), while others have intellectual functioning within a normal range. Individuals with ASD regardless of intellectual functioning have a DD that affects social communication skills and can limit independence in

home, school, work, and community environments and participation in social networks. Therefore, the principles put forth by ASHA regarding the rights of individuals with MR/DDs that guide the roles and responsibilities of speech-language pathologists in their service provision are also critically important for individuals with ASD (American Speech-Language-Hearing Association, 2005b, 2005c).

While promoting independence, self-determination, and self-advocacy of individuals with disabilities has become best practice, there has been less focus in this area for individuals with ASD (Wehmeyer & Shogren, in press). Individuals with ASD have the same basic rights as others but have unique needs with respect to learning independence and self-advocacy due to their core challenges in social interaction and verbal and nonverbal communication. Speech-language pathologists can contribute to the independence and self-advocacy of individuals with ASD by ensuring each individual has a functional communication system. Functional, spontaneous communication has been identified by the National Research Council (2001) as one of six instructional priorities. As pointed out in the MR/DD guidelines (American Speech-Language-Hearing Association, 2005b) and technical report (American Speech-Language-Hearing Association, 2005d), functional communication can include augmentative and alternative communication. Due to the issues with generalization, speech-language pathologists need to support communication in different social settings with a variety of partners to further participation, self-determination, and independence across contexts (Fullerton & Coyne, 1999; Wehmeyer & Shogren, in press).

Speech-language pathologists use, and teach others to use, strategies that are supported empirically and that address core challenges (see American Speech-Language-Hearing Association, 2006a; National Research Council, 2001). In addition, speech-language pathologists provide opportunities for individuals with ASD to learn and practice problem solving and communication related to independence and self-advocacy across environments (American Speech-Language-Hearing Association, 2006a; Renzaglia, Karvonen, Dragsgow, & Stoxen, 2003; Wehmeyer & Shogren, in press).

Principle 2. Due to the pervasive nature of social communication impairment, individuals with ASD should be eligible for speech-language pathology services.

Impairments in the social aspects of verbal and nonverbal communication are described as a core characteristic of ASD regardless of the instrument used for diagnosis (Baron-Cohen, Allen, & Gillberg,

1992; DiLavore, Lord, & Rutter, 1995; Joseph, Tager-Flusberg, & Lord, 2002). These social communication deficits encompass broad challenges in both joint attention and symbol capacity that may improve but persist across the life span (Tsatsanis, Foley, & Donehower, 2004). By their very nature, severe social communication challenges impinge on participation and progress in the general education curriculum, extracurricular settings, and other nonacademic settings, as specified as the basis for eligibility of services by IDEA. Therefore, the pervasive nature of the social communication challenges in individuals with ASD would support the team decision-making process to determine eligibility for language services in the schools (IDEA, 2004).

Despite the intent of IDEA and strong recommendations from the National Joint Committee for the Communication Needs of Persons with Severe Disabilities (NJC; 2003a, 2003b), eligibility is often denied to individuals with ASD on the basis of a priori criteria such as the following, which do not include individual needs, preferences, and priorities for communication:

- The practice of cognitive referencing. Speech-language pathologists are often asked to compare intellectual scores to language ability when considering eligibility. This practice is refuted by scientific evidence on several grounds. First, it cannot be inferred that intervention is only needed when language skills fall behind cognitive ability because the relationship between language and cognition is not simple and straightforward (Cole, Mills, & Kelley, 1994; Kassowski & Plante, 1997). Second, the tests that measure cognitive skills often feature similar items to the tests that measure language skills (Secord, 1992). Therefore, the same skills are often being measured and compared. Third, children whose language and cognitive scores are commensurate have been shown to benefit from communication intervention (D. Carr & Felice, 2000; Cole, Coggins, & Vanderstoep, 1999; Cole, Dale, & Mills, 1990; Warren, Gazdag, Bambara, & Jones, 1994). Based on this evidence, professionals agree that cognitive referencing is not an appropriate way to determine eligibility, yet it continues to be applied.
- Exclusion of services because of chronological age. This is especially vital considering the research regarding early intervention (National Research Council, 2001). The research clearly shows that infants, toddlers, and preschoolers benefit from communication services and supports (Amato, Barrow, & Domingo, 1999; Bondy & Frost, 1998; Garfinkle & Schwartz, 2002; Hancock & Kaiser, 2002; Moes & Frea, 2002). Conversely, individuals with autism can continue to develop communication abilities across their life span (Bedrosian, Lasker, Speidel, & Politsch, 2003; Hamilton & Snell, 1993; Mirenda, Wilk, & Carson, 2000; Rehfeldt, Latimore, & Stromer, 2003; Watanabe & Sturmey, 2003).
- Exclusion of services because of diagnosis. A diagnostic label on its own typically reveals very little about the individual's communication abilities; however, in the case of the autism spectrum, social communication impairment is encompassed in its very definition (Baron-Cohen et al., 1992; DiLavore et al., 1995; Lord & Corsello, 2005). Therefore, the diagnosis of ASD should indicate inclusion of communication services and supports rather than the exclusion of services.
- Absence of cognitive or other skills determined to be prerequisites to benefit from communication services or supports. Research has shown that individuals with ASD who do not show typically named prerequisite skills benefit from treatment (Amato et al., 1999; Bondy & Frost, 1998; Moes & Frea, 2002).
- Failure to benefit from previous communication services. Lack of progress has little to do with the individual but may be tied to other factors such as inappropriate goals, unsuitable intervention methods, failure to incorporate assistive technology, or insufficient methods in measuring outcome measures (NJC, 2003a).
- Lack of funding or adequately trained personnel. Lack of funding and expertise often fuels exclusionary practices. If trained personnel are not available, there is an obligation either to find trained personnel or to train existing personnel (*Timothy W. v. Rochester, NH School District*, 1989). Similarly, lack of funding does not constitute reason for exclusion from communication services and supports. IDEA states that identified needs have to be met.

These a priori eligibility criteria should not be used to preclude individuals with ASD from access to needed communication services and supports. The

reader is referred to the NJC (2003b) for a more complete discussion.

Principle 3. Speech-language pathologists play a critical role in the screening and diagnosis of individuals with ASD, as early intervention is a critical variable associated with positive long-term outcomes.

There is now mounting evidence demonstrating the effectiveness of intensive early intervention with a substantial proportion of young children with ASD (Dawson & Osterling, 1997; National Research Council, 2001). Research indicates that intervention provided before age 3 years has a greater impact than that after age 5 (Fenske, Zalski, Krantz, & McClannahan, 1985; Harris & Handleman, 2000). In spite of the severity of the behavioral characteristics of most children with ASD, the average age for diagnosis in the United States is not until 3 to 4 years (Filipek et al., 1999). The findings of McGee, Morrier, and Daly (1999) suggest that intervention beginning before age 3 years may have an even greater impact. Thus, there is a pressing need to improve early identification so that children with ASD can access intervention as early as possible. Although there have been significant advances in genetic and biomedical research on ASD, there is currently no biological marker for either autism or ASD. Therefore, screening and diagnosis must be based on behavioral features (Filipek et al., 1999).

Although most children with ASD are not diagnosed until at least 3 years of age, a clinical diagnosis of ASD at 2 years of age was found to be associated with the same diagnosis at 3 years of age or older in 90% of children studied (Lord, 1995; Stone et al., 1999). These studies indicate that impairments in social interaction and communication were found to be evident by 2 years, but restricted and repetitive activities and interests were not evident in some children until closer to 3 years of age. Lord (1995) found that lack of seeking another's attention and lack of response to voice were the clearest discriminators of children with ASD at 2 years based on parent interview. She also found that children with ASD differed from other children with DDs in understanding gesture, unusual use of others' bodies, seeking to share enjoyment, hand and finger mannerisms, and unusual sensory behavior.

The diagnostic features of ASD should be evident in very young children because they involve abilities that typically develop in the first 2 years of life. Most children identified as having ASD are reported by their caregivers to demonstrate symptoms within the first 2 years of life, based on retrospective accounts

(Short & Schopler, 1988; Wimpory, Hobson, Williams, & Nash, 2000). Furthermore, most families initially express concern to their pediatrician by the time their child is 18 months old (Howlin & Moore, 1997; Siegel, Pliner, Eschler, & Elliot, 1988). Speech-language pathologists are in a pivotal role to improve early detection of social communication problems in children with ASD because the first evident symptom is often the lack of language.

Given the importance of social communication in the diagnosis of ASD, the speech-language pathologist can play an important role in both screening and diagnosis. A broad-based multidisciplinary consensus panel concluded that all professionals involved in early health care, including speech-language pathologists, need to be able to recognize the symptoms of ASD and use autism screening tools to make decisions about appropriate referrals for further evaluations (Filipek et al., 1999). This panel emphasized the importance of interdisciplinary collaboration in assessing and diagnosing ASD, due to the complexity of these disorders, the varied aspects of functioning affected, and the need to rule in or rule out other disorders or medical conditions. Further, Filipek et al. stressed that professionals involved in diagnosis of ASD must be knowledgeable and experienced in using guides such as the *DSM-IV* along with results of various diagnostic assessment tools to make clinical judgments about these types of disorders. A comprehensive interdisciplinary assessment is important not only for diagnosis but also for intervention planning. Speech-language pathologists who acquire and maintain the necessary knowledge and skills can diagnose ASD, as part of a diagnostic team in schools or in other multidisciplinary collaborations, and should make appropriate referrals to rule out other conditions and facilitate access to comprehensive services. The speech-language pathologist who has been trained in the reliable and valid use of diagnostic and assessment tools as well as in the clinical criteria for ASD may be qualified to diagnose these disorders as an independent professional.

Principle 4. Speech-language pathologists should prioritize assessment and intervention approaches that are related to improvements in social communicative competence, that is, the ability to form relationships, function effectively, and actively participate in natural routines and settings.

Although a range of assessment and intervention approaches exist, empirical evidence is not yet available to predict which specific approaches will be the most effective given the unique characteristics and

challenges of individuals with ASD and their families (NRC, 2001). No one approach is equally effective for all individuals with ASD, and not all individuals in current outcome studies have benefited to the same degree (NRC, 2001). Given the broad impact of the social communication challenges and problems with generalization for individuals with ASD, speech-language pathologists should recognize the need to prioritize assessment and intervention approaches that emphasize effective communication in meaningful contexts and across natural communication partners. The NRC concluded that learning in natural environments appears to be the most socially valid approach (NRC, 2001). Not only do natural learning environments invite higher rates of initiation and generalization, progress in these contexts is more likely to result in school success and translate into a better quality of life and increased social acceptance (American Speech-Language-Hearing Association, 2006a, 2006c).

The efficacy of specific assessment and intervention approaches should not be judged by whether an individual has been placed in a general education environment, by whether improvements have been made on IQ scores, or by whether a child's rate of learning in isolated contexts has improved (National Research Council, 2001). Rather, essential outcomes should be related to improvements in social communication that affect the ability to develop relationships, function effectively, and actively participate in everyday life. Longitudinal research has, in fact, shown that positive outcomes in the hallmark features of the disorder, including joint attention, social reciprocity, language and related cognitive skills, and behavior and emotional regulation, are the most predictive of gains in language acquisition, socially adaptive functioning, and academic achievement (National Research Council, 2001). Therefore, assessment and intervention approaches should place an emphasis on positive changes in these developmental domains. Sample intervention goals are presented in a companion document (see Table 1 in American Speech-Language-Hearing Association, 2006a).

In a similar light, speech-language pathologists should be aware that positive, nonaversive approaches to addressing challenging behaviors are considered the most effective evidence-based practice for individuals with severe disabilities (Horner, Albin, Sprague, & Todd, 2000). Positive behavioral support directly targets the relationship between challenging behavior and communication by recognizing that these behaviors can serve one or more communication and/or regulatory functions (E. G. Carr et al., 1994; Fox et al., 2000; Prizant, Wetherby, Rubin, Laurent, & Rydell, 2003). In doing so, the fo-

cus is placed on assessment and intervention approaches in natural contexts that enhance quality of life across school, home, and community settings (American Speech-Language-Hearing Association, 2006c; E. G. Carr et al., 1994; Frea, Arnold, & Vittimberga, 2001).

Finally, given the tremendous heterogeneity among individuals with ASD and their families, ensuring socially valid outcomes requires consideration of the diverse needs, social settings, and priorities of a given individual and his or her family (National Research Council, 2001). Although emphasizing social and communicative competence should be the central focus, effective assessment and intervention approaches will vary according to an individual's unique profile of strengths and needs, her or his personal preferences, family priorities, and cultural and linguistic differences (American Speech-Language-Hearing Association, 2005b, 2006a). With this in mind, speech-language pathologists should be aware that although there is a range of specific packaged programs available, the name of the approach is less important than how individually appropriate services are designed for the individual with ASD, his or her family members, and other communication partners (National Research Council, 2001, p. 220).

Principle 5. Speech-language pathologists should form partnerships with families of individuals with ASD in assessment and intervention, while incorporating family preferences, honoring cultural differences, and respecting the challenges associated with limited resources.

A commitment to effective service delivery for individuals with ASD requires that speech-language pathologists work collaboratively with families in assessment and intervention, as well as in determining agendas for advocacy and research. In true partnerships, speech-language pathologists will place a high value on seeking and respecting family views, in recognizing the transactional nature of the disorder when evaluating family interactions and relationships, and in individualizing services to the needs and desires of the family (Marcus, Kunce, & Schopler, 2005). Family beliefs, values, and resources will vary, based on culture, economic factors, and individual family variability. In addition, family systems are dynamic rather than static, with family interactions and needs changing over time. These factors will influence the manner and extent to which families are interested and able to participate in assessment and intervention activities as well as the nature of support they will seek from professionals, including speech-

language pathologists. Family members have extensive knowledge of the developmental history, current functioning, and possible future environments of the family member with ASD that is important in differential diagnosis, assessment, and program planning (e.g., Domingue, Cutler, & McTarnaghan, 2000; Lord & Corsello, 2005). The participation of families in services aimed at addressing the needs of the individual with autism can serve to either increase or ameliorate the stress experienced by family members (National Research Council, 2001). Such participation also influences the effectiveness of intervention (National Research Council, 2001). Maximizing the potential benefits for both the individual with ASD and other family members while minimizing harmful effects requires that speech-language pathologists appreciate the myriad and complex factors that will influence the quality of collaborations between professionals and families.

Various authors have observed that ASDs appear to elicit more than their share of unproven treatments promoted with enthusiastic but nonscientific claims for effectiveness (e.g., Cohen, 1998; Herbert, Sharp, & Gaudiano, 2002; Metz, Mulick, & Butter, 2005; Romanczyk, Arnstein, Soorya, & Gillis, 2003). Parents of individuals with ASD may be particularly vulnerable to pursuing such treatments or interventions, owing to such factors as the emotional impact of learning one's child has a serious, probably lifelong disability while the child is still very young; the dissonance between the normal physical appearance of most children with ASD and the poor prognosis for normal adaptation; the lack of scientifically validated treatments or interventions that result in recovery from the disorder, and the hope created by reports of dramatic improvements in some individuals with ASD. Professionals, including speech-language pathologists, are accountable for using practices and developing practice policies that are most likely to yield positive outcomes, given the current available evidence (American Speech-Language-Hearing Association, 2003, 2005a). Professionals have an important role in assisting families in evaluating the evidence available on intervention options for a family member with ASD, as well as evaluating the progress of the person with ASD once interventions are implemented or modified. The speech-language pathologist can also help assist families in differentiating treatments that lack an evidence base from those that are contraindicated based on available research. Even when aware of a lack of evidence, families may elect to adopt unproven interventions based on the belief that waiting for definitive research would preclude the opportunity for their family member with ASD to benefit from the intervention (Cohen, 1998).

Principle 6. Speech-language pathologists should collaborate with families, individuals with ASD, other professionals, support personnel, peers, and other invested parties, as this supports the identification of critical priorities that will lead to functional outcomes across social partners and contexts.

First and foremost, speech-language pathologists in partnership with individuals with ASD and their families need to ensure that treatment goals are appropriate to the needs and values of the individual and his or her family. Gains in functional communication, which maximize a sense of communication efficacy, should be targeted. Outcomes must be meaningful within the family and larger cultural setting. Ultimately, gains in communication skills should lead to an enhanced sense of self-determination, defined as "living one's life consistent with one's own values, preferences, strengths and needs" (Turnbull, Turnbull, Erwin, & Soodak, in press). Related ASHA (2005b, 2005c, 2005d) publications further acknowledge the communication needs and rights of persons with mental retardation, a population which shares much with ASD given that as many as two thirds of individuals with ASD have been documented to function in the moderate to severely retarded range.

The pervasive nature of the communication challenges and the concomitant need for intensive programming require the adoption of a model of service delivery that extends beyond prevailing pull-out services, targeting various communication partners as well as a variety of communication contexts so that communicative behaviors are supported around the clock (Paul-Brown & Caperton, 2001). To create ample opportunities for successful communication, a close collaboration between all parties involved is critical (for a more extensive discussion of such cross-disciplinary collaboration, see Peck & Schuler, 1987).

To maximize the experience of communication success, interventions should have an ecological orientation, aimed not at the remediation of intrinsic deficiencies within the individual with ASD, but at broadening the range of intervention contexts and adapting those contexts to the needs and characteristics of the individuals with ASD as well as their communication partners in their everyday activities. For a more comprehensive discussion of the need to support communication partners, see Kaiser, Hester, and McDuffy (2001). Efforts to include communication partners in intervention plans should not be limited to parents, siblings, teachers, and allied professionals. They should, most importantly, include typically developing peers within a range of

school and community settings, mandated to include individuals with ASD (see H. Goldstein, 2002; Strain & Kohler, 1998; Wolfberg & Schuler, in press).

The implementation of collaborative models has also direct implication for assessment practices. The close participation of all pertinent parties is needed to develop a complete inventory of means and functions of communication across contexts (Schuler, Peck, Willard, & Theimer, 1989; Wetherby et al., 1998). This underscores the importance of multiple observers and informants who can help to (a) create a comprehensive picture of communicative behaviors as a function of specific contexts and communication partners and (b) socially validate assessment outcomes and the selection of meaningful assessment goals. Moreover, an inventory of communicative means and functions invites closer collaboration with behavior specialists and special education teachers so that the interrelationship between behavior challenges and communicative repertoires can be better understood.

Once the communicative functions of problem behaviors are understood, more effective and mutually satisfactory means of communication can be taught. The frequency of undesirable, apparently aberrant behaviors may thus be reduced through positive behavior support, including the differential reinforcement of communication alternatives (Buschbacher & Fox, 2003; E. G. Carr & Durand, 1985). Such focus on positive behaviors has demonstrated to be more effective than more traditional behavior reduction methods (E. G. Carr et al., 2002). Moreover, positive behavior changes are more likely to generalize than behavior changes associated with the use of punishment (E. G. Carr & Durand, 1985; Horner et al., 2000). Again, close collaboration is required in the search for more effective communication alternatives to benefit individuals, who are challenged in the consistent production of speech. Since the introduction of alternative and/or augmentative means of communication (AAC) has proven to be especially powerful in replacing undesirable means of communication (Bopp, Brown, & Mirenda, 2004; Frea et al., 2001), close collaboration between the individual with ASD, his or her family, speech-language pathologists, and other professionals is critical. So far, the available research literature does not predict which forms of AAC will be most beneficial for which individuals with ASD (National Research Council, 2001). Only ongoing research, involving careful appraisals of communication status and the monitoring of communication progress, will help clinicians make well-informed choices that respect the preferences of the individuals involved, their families, and their cultural values.

Conclusion

An in-depth review of diagnostic criteria as they have evolved since Kanner first introduced ASD reveals the central role played by differences in social communication, including joint attention, social reciprocity, symbolic representation, and related cognitive skills. The facts that these differences, affecting verbal as well as nonverbal communication, are so pertinent to the diagnosis and ongoing assessment of individuals with ASD and that progress is defined by gains in social communication make the participation of speech-language pathologists critically important to the delivery of support services. It is anticipated that because of their expertise in early communication development, increased participation of qualified speech-language pathologists in the diagnostic process may facilitate earlier referral and identification of ASD and thereby produce better outcomes over time, as suggested by the findings of early intervention research. To fulfill this role, it is essential that speech-language pathologists participate in high-quality preservice and continuing education efforts and help advance our knowledge base by participating in and/or be informed of research efforts.

The broad-based challenges in social communication experienced by individuals with ASD and their families may make them eligible to receive the services of a qualified speech-language pathologist regardless of intellectual status, age, or presumed prerequisites. Documented DDs in the domain of social communication, usually combined with mental retardation, should entitle individuals with ASD to receive communication services tailored to their needs just like other persons with DDs and MR. In providing such services, the cultural, linguistic, and cognitive diversity of individuals with ASD needs to be respected along with family values and preferences to select the most suitable intervention goals and methods.

Finally, the pervasive nature of the impairments in social communication as detailed in this paper and the ineffectiveness of low-intensity pull-out services urge a critical reevaluation of service delivery models and demands that speech-language pathologists work in close collaboration with families, other professionals, and support personnel, as well as typically developing peers. In doing so, they need to adopt an ecological orientation, setting the stage for communication success and, ultimately, self-efficacy and self-determination by creating inspiring and inclusive communication contexts and by coaching communication partners, including family members as well as peers, to be more responsive partners.

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